

# Immunization Status of Two-Year-Old Infants in Memphis and Shelby County, Tennessee

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TO EVALUATE the immunization status of infants and children in Memphis and Shelby County, Tenn., three studies were undertaken during 1962. Two of the studies were concerned with infants aged 4 months and with first-grade school children. The sample selected for the third study, reported here, consisted of all live infants born to Negro residents during January 1960.

Of 642 Negro infants born during this period, 24 died and 12 moved outside Shelby County. Data were obtained for 524 (86.5 percent) of the remaining 606 2-year-olds. For 3 infants, the parents were unable to give any information, and for 79, neither parent could be located.

Information as to the number of injections of polio vaccine and of DTP received, as well as whether smallpox vaccine had been given, was obtained for 45 percent of the children from the records of the communicable disease division and the well-child clinics of the Memphis and Shelby County Health Department. When these sources did not yield the desired information, a questionnaire was sent to the mother at the address given on the birth certificate. If this method was not effective, efforts were made to reach the mother by telephone or home visits, or both.

Except when stated to the contrary, percentages included in the following analyses are based on the number of infants for whom information was available. In the bar diagrams this percentage is represented by the top of the bar. It is recognized that an error is inherent in exclusion, from the denominator, of infants for

whom information is not available. It is generally accepted that persons for whom information cannot be obtained usually perform less satisfactorily in terms of health promotion and preservation than do those for whom information can be secured. A dotted line is inserted in each bar of the diagrams showing what the percentage would be had the basis of calculation been the entire sample. The true answer is considered to lie somewhere between this dotted line and the top of the bar.

Regarding DTP immunization status of the infants, 86.3 percent had received one injection, 79.4 percent two injections, 72.1 percent three injections, and only 24.2 percent four injections (fig. 1 and table 1). For polio vaccine, 79.4 percent had received one injection, 70 percent two injections, 37 percent three injections, and 2.5 percent four injections (fig. 2 and table 1). As shown in table 1, 67.2 percent had also been vaccinated against smallpox.

The greater percentage of DTP immunizations over the other antigens is undoubtedly partly related to the following schedule used in this department:

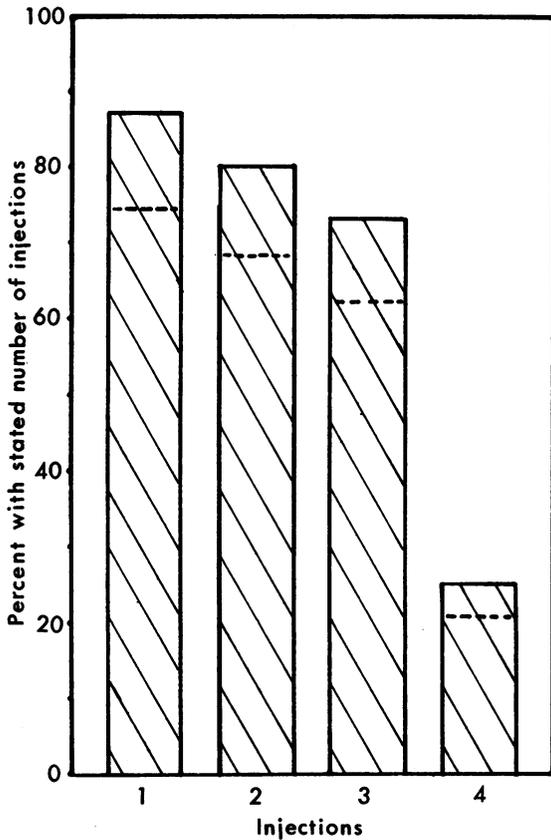
<i>Antigen</i>	<i>Interval from preceding dose</i>
DTP.....	2 or 3 months of age.
DTP, polio.....	4 weeks.
DTP, smallpox.....	4 weeks.
Polio.....	4 weeks.
Polio.....	7 months.
DTP.....	1 year after third DTP.
Polio.....	1 year after third polio.

DTP is begun first and the three injections are given at intervals of only 1 month. Polio is begun later and the long interval between the second and third injections is probably a significant factor in the small proportion of infants

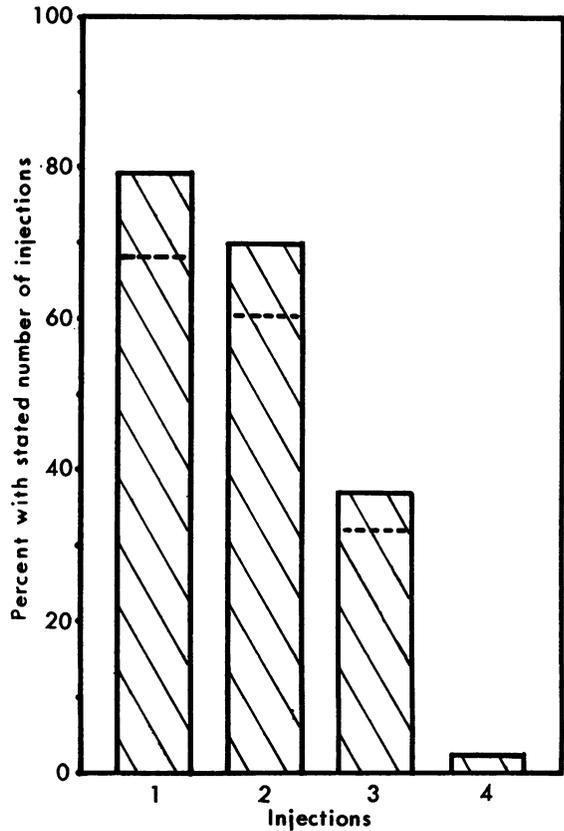
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**Figure 1. DTP immunization status of 2-year-old Negro infants, Memphis and Shelby County, Tenn., 1962**



**Figure 2. Poliomyelitis immunization status of 2-year-old Negro infants, Memphis and Shelby County, Tenn., 1962**



See note under figure 1.

NOTE: Cumulative percentage of infants who received the stated number of injections, or more, based on the number of infants for whom information was available. The dotted line would be the top of each bar if percentages were based on the complete sample, including infants for whom no information was available.

having received the third injection by the end of their second year of life.

By the end of the third month of age, 54.6 percent of the infants had received some immunizing procedure (fig. 3 and table 2). This proportion rose rapidly during the next 5 months, and had reached 85.2 percent by the end of 9 months, and 88 percent at the end of 2 years.

Immunization performance was evaluated relative to several variables. The most significant of these proved to be whether or not the infant was the first child born to its mother. Ninety-nine of the 606 infants in the study were first born. These children displayed definitely superior performance in all aspects of immuni-

zation examined. Seventy-six percent of the first-born children had begun immunization before the end of the third month of life. This figure rose rapidly to 96 percent during the seventh month. Of first-born children, 92 percent had received some polio vaccine compared with 76.8 percent of other children. Fifty-six percent of first-born children had received three injections of polio vaccine compared with 33 percent of others (fig. 4 and table 1).

Of first-born children, 95.5 percent had received some DTP compared with 84.4 percent of others (fig. 5 and table 1). Eighty-six percent of first-born children had received three DTP injections compared with 69 percent of others. Eighty-five percent of the only children had been vaccinated against smallpox, whereas, of infants with older siblings, only 63.5 percent had been vaccinated.

Of the total 606 infants, 204 were illegitimate.

**Table 1. Immunization status of 2-year-old Negro infants, by birth order and type of vaccine, Memphis and Shelby County, Tenn., 1962**

Number of injections or vaccinations	Polio vaccine						DTP						Smallpox vaccine					
	First born		Not first born		Total		First born		Not first born		Total		First born		Not first born		Total	
	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>	Number	Percent <sup>1</sup>
0	7	8.0	101	23.2	108	20.6	4	4.5	68	15.6	72	13.7	13	14.8	159	36.5	172	32.8
1 or more	81	92.0	335	76.8	416	79.4	84	95.5	368	84.4	452	86.3	75	85.2	277	63.5	352	67.2
2 or more	75	85.3	292	67.0	367	70.0	82	93.1	334	76.5	416	79.4						
3 or more	49	55.7	145	33.2	194	37.0	76	86.4	302	69.2	378	72.1						
4 or more	1	1.1	12	2.8	13	2.5	35	39.8	92	21.2	127	24.2						
Known <sup>2</sup>	88		436		524		88		436		524		88		436		524	
Unknown	11		71		82		11		71		82		11		71		82	
Total	99		507		606		99		507		606		99		507		606	

<sup>1</sup> Percentages based on the number for whom information was available.

<sup>2</sup> Total of those for whom information was available.

Comparison of immunizations received by legitimate and illegitimate infants did not reveal any marked differences. The relatively good showing in regard to immunization of illegitimate infants may be related to the fact that there was a disproportionate number of

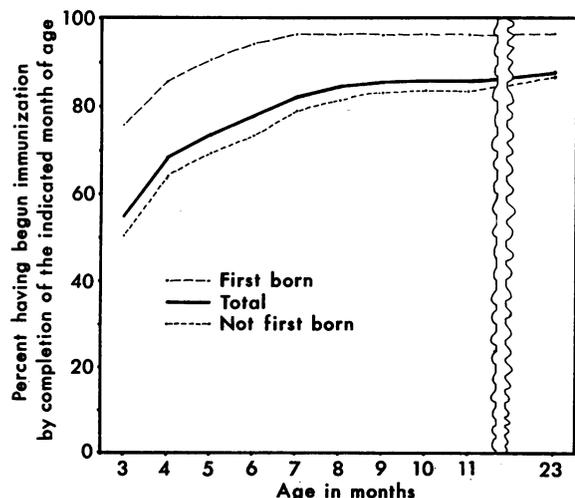
first-born infants among them. Comparison of performance on the basis of the hospital of birth likewise revealed no significant differences. Well over 99 percent of Negro infants delivered in this county are born in hospitals; the great majority in John Gaston Hospital (492 of 606). This hospital serves the indigent and part-pay, low-income groups of Memphis and delivers almost all illegitimate Negro infants. It had been expected that infants born in private facilities would be immunized earlier and more completely, but such was not the case among those included in this study.

Comparison of infants according to the residence of the mother showed that those from Shelby County outside Memphis performed slightly better than those with a Memphis address: however, these differences were small and are not statistically significant at the 5 percent level.

### Discussion

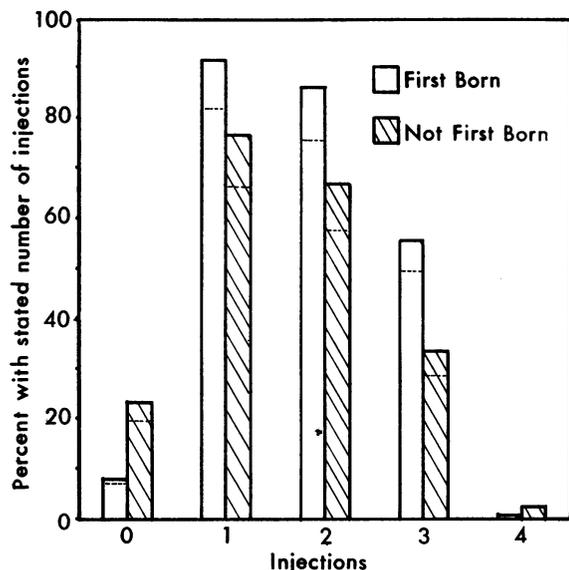
These data confirmed earlier conclusions that many Negro infants in Memphis and Shelby County do not begin immunizations as early as desirable, and that an appreciable number are unimmunized or inadequately immunized at 2 years of age.

**Figure 3. Percentage <sup>1</sup> of Negro infants having started immunization, by month of age, Memphis and Shelby County, Tenn., 1962**



<sup>1</sup> Based on all children for whom information was available.

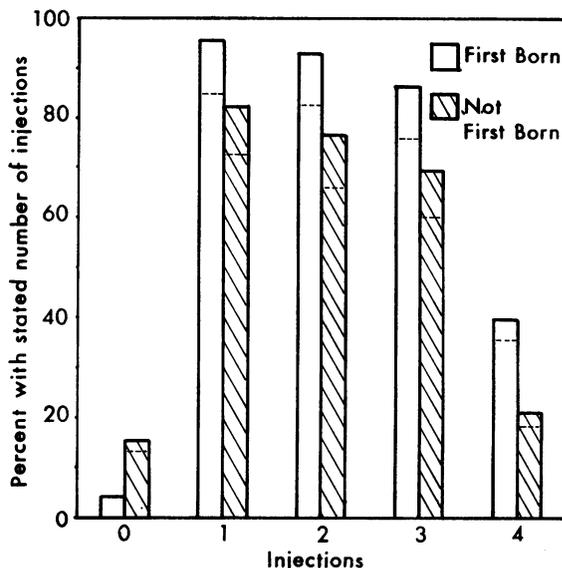
**Figure 4. Poliomyelitis immunization status of first-born and not first-born 2-year-old Negro infants, Memphis and Shelby County, Tenn., 1962**



See note under figure 1.

The best showing is made for DTP with a fairly satisfactory proportion of infants, 72.1 percent, having received three injections before the end of the second year of life. Although

**Figure 5. DTP immunization status of first-born and not first-born 2-year-old Negro infants, Memphis and Shelby County, Tenn., 1962**



See note under figure 1.

performance is fairly good for the first and second polio injections, this group is inadequately protected at 2 years of age, with only 37 percent having received the third polio injection. The level of smallpox immunization

**Table 2. Age at which immunization was begun, 2-year-old Negro infants born during January 1960, Memphis and Shelby County, Tenn.**

Age when immunization began (months)	First born		Not first born		Total	
	Number of children	Cumulative percent <sup>1</sup>	Number of children	Cumulative percent <sup>1</sup>	Number of children	Cumulative percent <sup>1</sup>
3 or less.....	59	75.6	209	50.5	268	54.6
4.....	8	85.9	58	64.5	66	68.1
5.....	4	91.0	21	69.7	25	73.2
6.....	3	94.9	19	74.3	22	77.6
7.....	1	96.2	20	79.1	21	82.0
8.....	0	96.2	11	81.8	11	84.2
9.....	0	96.2	6	83.3	6	85.2
10.....	0	96.2	2	83.7	2	85.8
11.....	0	96.2	0	83.7	0	85.8
12-23.....	0	96.2	11	86.4	11	88.0
No immunization.....	3	3.8	56	13.6	59	12.0
Known <sup>2</sup> .....	78	-----	413	-----	491	-----
Unknown.....	21	-----	94	-----	115	-----
Total.....	99	-----	507	-----	606	-----

<sup>1</sup> Percent having begun immunization by the end of the period indicated based on all children for whom information was available.

<sup>2</sup> Total of those for whom information was available.

leaves something to be desired, with 67 percent having been immunized by the end of the second year.

It had been previously observed that more children of young mothers receive immunization than do those of older mothers. It was, therefore, not particularly surprising to find that first-born infants begin immunization earlier, receive more injections and vaccinations, and achieve a higher percentage of immunization than do those who have an older sibling at birth. At first this seems in direct conflict with the concept that given accurate information plus the motivation of personal experience, people can be depended upon to act intelligently in the future regarding the health of those for whom they are responsible. It would generally be assumed that a mother who had had her first child immunized would ordinarily be expected to have her other children immunized as well. However, there is a practical consideration

which is probably the dominant feature; namely, that the mother's mobility and her ability to take her infant for immunization are greatly impaired by the presence in the household of an older but still dependent child. This consideration is probably of a special importance in the low-income groups.

### Conclusion

The findings of this study reveal that the DTP immunization status of 2-year-old Negro infants is fairly satisfactory, but there is a serious deficiency in immunization against poliomyelitis and a less serious but relatively unsatisfactory level of smallpox immunization. For many infants the beginning of immunization is delayed past the recommended 2 or 3 months. These deficiencies require that new or more intensive efforts, or both, be made toward promotion of immunization for Negro infants in this community.

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